



TELUS PARTNERED WARM HOME SOLUTIONS

***WIRING GUIDELINES FOR SINGLE FAMILY DWELLINGS
FOR BC***

Version 2.0WH

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one connection, endless possibilities.

For years, TELUS has been providing excellence through ongoing development of existing and future products and services for our community. As part of the TELUS Future Friendly Home, we would like to introduce you to our Warm Home. To enjoy the benefits of a Warm Home it does not have to be expensive, time-consuming, or complicated.

The TELUS Warm Home Program works along with the TELUS Home Solutions Partner Program to help residential builders and developers provide premium telecommunications solutions to their homebuyers while raising the development's profile through carefully planned marketing. The Warm Home enables the delivery of TELUS services to the homeowner at the time of move in, allowing the homeowner to focus more on other pressing matters. These services span across three primary types of media: telephone, high-speed internet access, and television. With such services available at consumers' fingertips almost immediately, they'll have an extra incentive to confirm their purchase.

This document provides guidelines and recommendations for pre-wiring new homes with Ethernet cables (Cat 5e) during the construction stage, prior to the installation of drywall. The guidelines are best used when combined with the TELUS Hub, where all telecommunications cabling comes together in the home.

As technology continues to evolve, so should the cabling systems to support homeowners' changing needs. TELUS recommends an integrated end-to-end solution for all category 5e wiring cabling by fully trained and certified electricians and wiring contractors.. And to make residential development projects as straightforward as possible, TELUS will continue to make changes to this document to ensure alignment with Residential Cabling Standards and CSA T525.

For more information about the Warm Home Program, and how we can help you differentiate a residential development project in your community, please call us today at 1-866-844-1544 or visit our website:

<http://www.telus.com/mybuilding>

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1. Terms and Conditions of Use

- (a) Any installation of premise wire shall be in accordance with the laws, rules, regulations, technical standards and codes in effect at the time of installation, whether federal or provincial.
- (b) The rewiring of a premise will have an immediate impact on the service to the premise as well it could affect the network system of TELUS. As a result TELUS advises that any design, installation and wiring is to be carried out by a trained telecommunication technician. All telecommunications technicians are to be trained and certified by the manufacturer and supplier of the product or equipment to be installed.
- (c) This document makes references to and summaries of the rules as provided in the *Canadian Electrical Code* (CEC). The reference and summaries of these rules are provided for brevity and convenience. Prior to any design, installation or rewiring of a premise, every trained technician is to be familiar with the CEC.
- (d) The CEC and the Provincial or Municipal Electrical Inspection Branch may require a permit prior to any rewiring, adding to, or rearranging the communications and data interior wiring. They may also require that the work be inspected upon completion. Contact your local (Provincial or Municipal) Electrical Inspection Branch for further information regarding these requirements.
If outlets are to be located in exterior walls (or walls between suites) obtain advice on maintaining the integrity of the vapour barrier or fire-rated wall.
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- (k) By using this document, you agree that these Terms and Conditions shall be governed by the laws of the province of British Columbia and the federal laws of Canada applicable therein and you agree to be bound by the laws of these jurisdictions.

2. General Information



Purpose of guide

This guide is intended for use in new construction, additions and remodeled single dwellings for telephone, TELUS multimedia services, broadband Internet or home networking. This guide specifically applies to wood frame residences.

What you are responsible for

You are responsible for:

- (a) correcting any service difficulty that the installation or rewiring creates and which harms the telecommunications network;
- (b) paying a service charge when TELUS makes a repair visit to your premises in order to remedy problems resulting from wiring that has been improperly installed or maintained.

Description of rewiring

Rewiring is a method of installing communications and data cabling such that it is concealed within the interior partition walls of your home. Rewiring is done at the framing (or hollow frame) stage at the same time as the electrical wiring, and before the application of insulation, drywall, and vapour barrier. Once the walls have been surfaced, existing wiring cannot be removed or replaced without disturbing the wall.

2.1 Definition Of Terms

1. **BIX** – means a block or strip into which conductors from a network cable are punched (eg. Belden/CDT IDC).
2. **Cat-5e** – means commonly and readily available standard network cable.
3. **DD, Distribution Device** – means one or any combination of the following: cross-connect; router; WAP; switch; or ADSL modem.
4. **8-pin Modular Jack** – means a standard socket or jack found within a multimedia outlet (often called RJ-45).
5. **IDC** – means an Insulation Displacement Connector being a type of wire connection device in which the wire is "punched down" into a double metal holder and as a result, the metal holders strip the insulation away from the wire, thus causing the electrical connection to be made.
6. **Inside wire** – means the wiring that is under the responsibility and control of the customer.
7. **MO, Multimedia Outlet** – means a wall mounted or flush mounted unit that may house a number of sockets or jacks for connecting up Cable-TV, telephone or data network devices.
8. **NIB** – means Network Interface Box often containing Protector, POTS Splitter, etc.
9. **OC, Outlet Cable** – means a cable run that originates from the DD and terminates in a room at a Multimedia Outlet (MO).
10. **Set Run** – a run of standard Cat-5e cable comprising a group of eight wires or four pairs, each wire corresponds to a pin on the 8-pin modular jack.
11. **CCP/CCB** – customer connection point or block.
12. **PC** – a personal computer.

3. Quick Summary of Key Points

▶ **A MUST READ FOR CONTRACTORS** ◀

3.1 Routing Cables

[see Section 4.4 for details]

- ✓ individual Cat-5e runs, in 1" conduit preferred, 90m maximum length.
- ✓ do not run cables near power, light fixtures, transformers, fluorescent lighting.
- ✓ **do not bend cable sharply** - observe minimum bend radii of cable, do not crimp, pinch or stretch
- ✓ install a single unbroken length between outlet and Distribution Device (DD) which is located at a centralized location, ie. Star Wiring Topology, no daisy chaining, no splicing of cable sections.

3.2 Outlet Installation

[Section 5.4]

- ✓ room outlets include a single 8-Pin modular jack (RJ-45) for TELUS TV or a double modular jack (RJ-11 & RJ-45) for Tel/Data.
- ✓ minimum install two outlets per room.
- ✓ minimum install one outlet adjacent to each Cable-TV outlet.
- ✓ terminate all 8 conductors in the outlet cable to the jack according to TIA/EIA-568-A standard.

3.3 Central Distribution Location / DD

[Section 6]

- ✓ all installed runs of outlet cable must be terminated at a centralized location that will allow placement of a cross connect, switch/router and programmable equipment. This is the Distribution Device (DD).
- ✓ 18" x 18" (minimum) space REQUIRED in closet/storage room at reasonable working height (48") for cable run terminations, and for the central distribution location (ie. the DD).
- ✓ 1 x duplex 15A unswitched power receptacle dedicated to TELUS equipment and installed next to panel or within the reserved space. [Section 6.1]
- ✓ grounding mandatory if metal cabinet installed [Section 6.1]
- ✓ locate your DD panel/cabinet no closer than 12" (30cm) to a power distribution panel
- ✓ complete the Label on the inside of the DD Panel cover by identifying the outlet cable runs, with MO location id (**e.g. MBR01**) and type of service on each if known.



3.4 TELUS Media Hub Installation Notes

[Section 11]

4. Planning Multimedia Outlet Locations and Cable Routing

4.1 Introduction

To enable your home for enhanced systems, TELUS multimedia services, or, as a smart home, all installed runs of outlet cable must be terminated at a centralized location that will allow placement of a cross connect, switch/router and programmable equipment that your system requires. This centralized location is identified by the Distribution Device (DD) in most diagrams (see Diagram 1, 2 & 3). A prewired cable run to the network interface box (NIB) from the centralized location or DD will also be required.

When selecting Multimedia Outlet (MO) locations, select those that suit both your present and future needs. TELUS suggests you consider a minimum of two (2) outlets in each of the areas shown here in Diagram 3. A separate cable run will be required for each service or device at each outlet. For example, if the outlet contains two sockets, one for telephony and one for Internet service, then two sets of four-pair cable may need to be run to this outlet. For rooms designated as likely candidates for the location of entertainment or multimedia equipment (e.g. living room, family room, home office, home theatre room or den), additional wall outlets should be allocated.

It is not necessary to have a communications and data device connected at every prewired location, however, by planning ahead you reduce the cost of future outlet installations. Unsightly surface wire, additional installation time and inflexibility of device arrangements are consequences of not planning. Adequate wiring will give customers flexibility in arranging their telephone, second line, FAX lines, and multimedia services such as TELUS PureRadio or networked audio devices.

Please refer to Form P546 (BC) or P630 (AB) for connection to TELUS service and owner / developer's support and housing requirements.

Wiring standards should also be considered to accommodate for tomorrow's communication technologies. Security wiring and cablevision wire should also be planned at this time. For details on wiring standards please see *Section 5 - Wire/Cable and Hardware*.

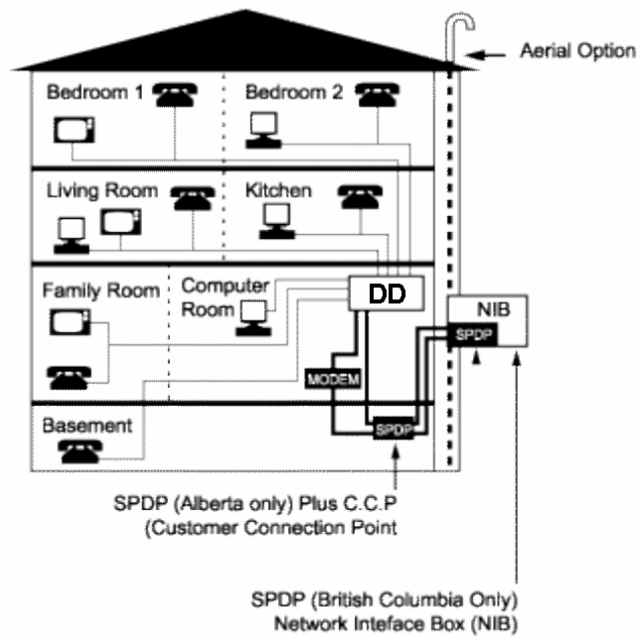
TELUS must be contacted when the pathway is in place to install the service entrance wire and the demarcation block.

4.2 Outlet Locations - Recommendations and Best Practices

Suggestions for locating outlets can be found in Diagram 3.

In each room, locate outlets as follows:

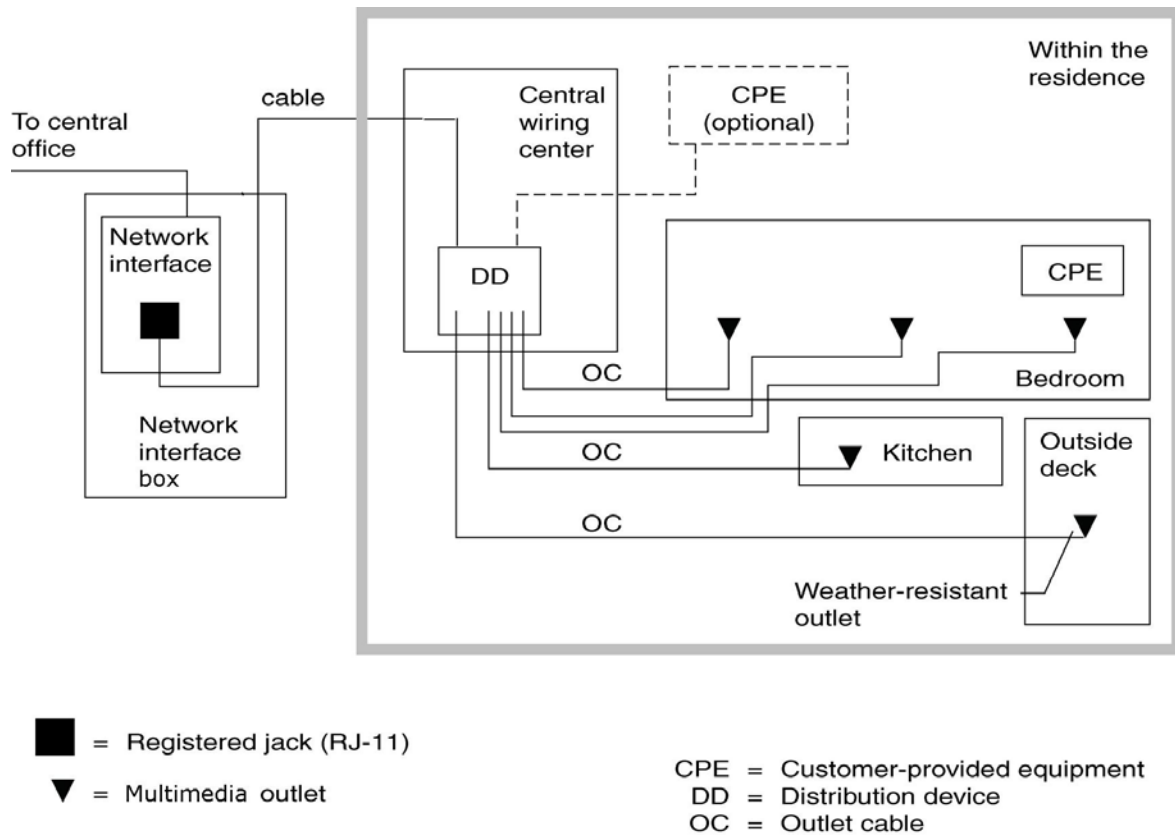
- 1) to allow two per room minimum, at least one near the Television and one for the PC or telephone;
- 2) on walls that make up a corner where Television or PC might be located;
- 3) to prevent cross-room or cross doorway cable runs – see Diagram 3; and
- 4) to suit present and future needs, e.g. TELUS multimedia services use in the kitchen.

DIAGRAM 1**LEGEND**

TELEPHONE
TELEVISION
COMPUTER

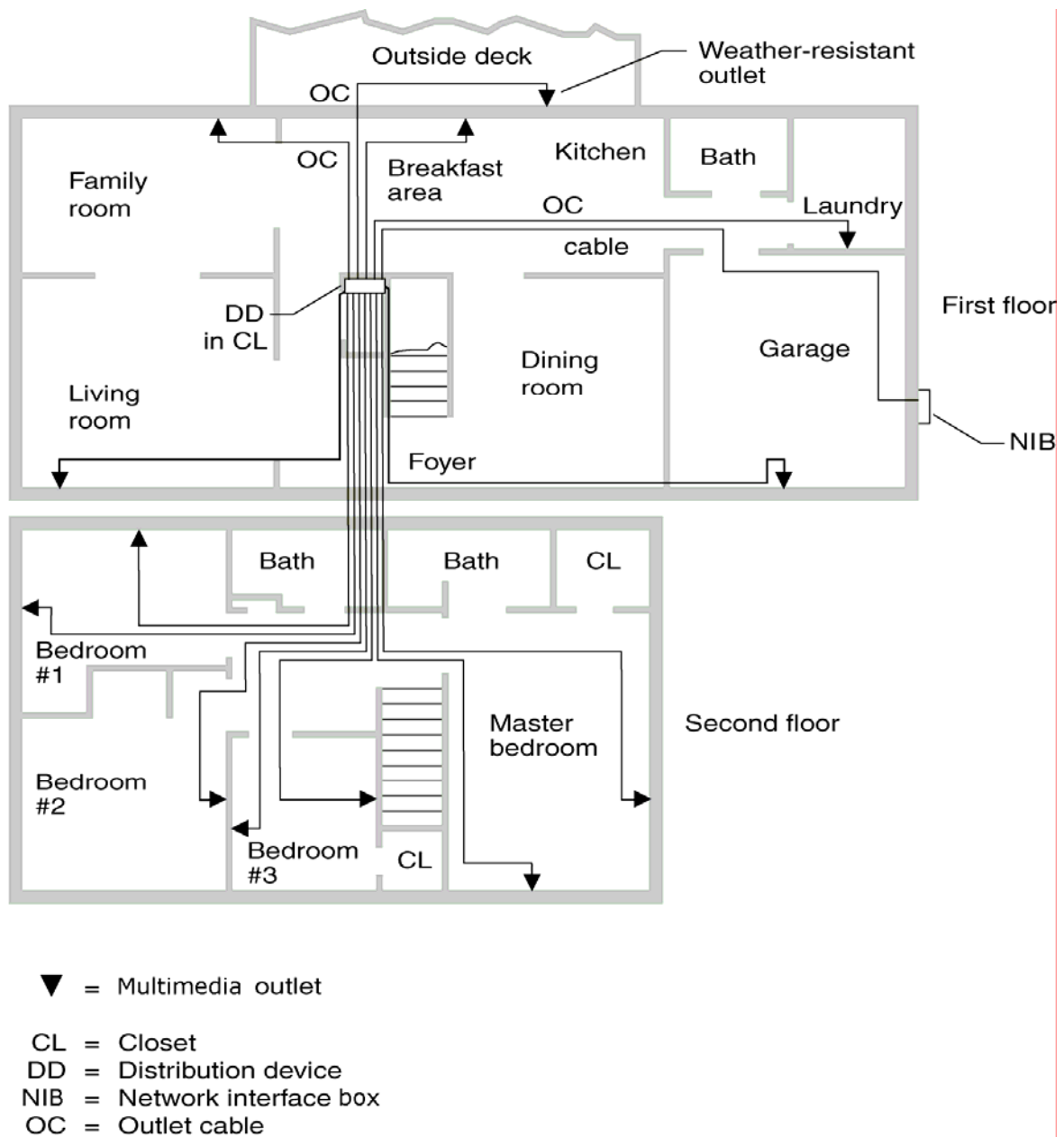
DD Distribution Device
NIB NETWORK INTERFACE BOX (NIB)

SPDP: SERVICE PROVIDER DEMARCATION POINT
DEMARCATIION POINT: A POINT WHERE THE OPERATIONAL CONTROL OR OWNERSHIP CHANGES



Courtesy of BICSI®

Diagram 2: Typical Residential: LOGICAL VIEW



Courtesy of BICSI® / Modified by TELUS

Diagram 3: Typical Residential Premises Cabling System (Physical View)

4.3 Other Considerations For New Homes

Install a standard electrical outlet box (300 mm/12 in to floor) to a stud at each location that a computer, television, powered phone may be required to accompany each multimedia outlet.

4.4 Cable Routing

Plan the route to avoid possible damage from future construction, rubbing, overheating, dampness, or contact with power wires. The Canadian Electrical Code, Part 1, (Rule 60-300) requires a minimum of 50 mm (approximately 2") separation from power cables. We recommend 12 inches.

The cable route must follow a supported path through floor joists, over ceilings, through wall studs, and behind baseboards. If possible, the route you select should conceal the cable.

TELUS recommends a minimum of two cable runs (ie. two separate four-pair cables) to each multimedia outlet to provision for future growth or upgrade of the multimedia outlet (faceplate).

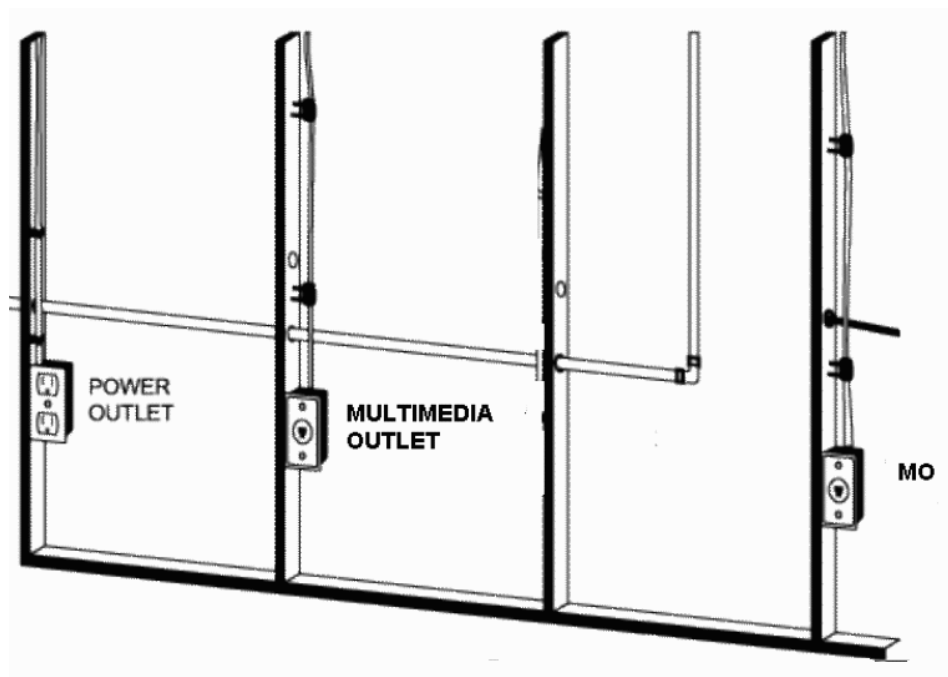
Separate runs will allow for ease of movement and arrangement of an occupants telephone, Internet or advanced multimedia services; will reduce time to locate faults and allow sufficient cable pairs for maintenance and provide for future service additions.

Things not to do

- Do not run parallel to power cables within the same stud or joist space, otherwise transmission and interference problems may be experienced. Refer to Diagram 4 for suggested correct installation.
- Do not run communications and data cables through holes occupied by electrical cables.
- Do not run communications and data cables in parallel with any power wiring.
- Multimedia outlets **should not** be located within the same studs as a power outlet.
- Never run power in same conduit as communications and data cables.
- If power cables are housed in (metal) armored sheathing, then the above limitations may not apply, likewise minimum separations may not apply since damaging power emissions (EMI) are shielded by the sheathing.
- Ensure avoidance of fluorescent light fixtures – see Table 1 below for minimum separations.
- Ensure avoidance of low-voltage style track light fixtures containing transformers.
- Do not bend communications and data cables sharply – minimum bend radii four x diameter of cable for cat-5e, 2.5 inch for co-ax RG-6.

TABLE 1 – Minimum Separations Guide

Interferer	Clearance
Fluorescent lighting	12 " (305 mm)
Power cables (110V)	12 " (305 mm)
Unshielded power <2kVA	5 " (127 mm)
Unshielded Power >5kVA	24 " (610 mm)
Transformers / motors / elevators	40 " (1016 mm)

**Diagram 4:** Correct placement of cables and outlets

4.5 Telephones And Communications Devices In Bathrooms

The Canada Electrical Code, Rule 60-400 in summary provides: Communication equipment located in a bathroom shall be permanently fixed on the wall, and shall be located so that no part may be reached or used from the bath or from the shower enclosure.

Telephone jacks are not permitted in bathrooms.

4.6 What Type Of Telephony Devices To Connect?

Telephony devices shall be certified and approved by CSA International (CSA) identified by the following mark.



Note:

Faulty customer-owned telephony equipment could result in a service charge if TELUS is called to diagnose the problem.

Figures 2 and 3 are extracted, courtesy of BICSI®, from BICSI® Telecommunications Distribution Methods Manual (TDMM), 10th edition, Chapter 17 (Residential Cabling).

5. Wire/Cable and Outlet Hardware

5.1 Wire Or Cable Selection

Telecommunications wiring must comply with all laws and regulations, whether federal or provincial and the Canadian Electrical Code.

The minimum grade of inside wiring TELUS recommends is (CAT-5e) Inside Wiring Cable (IWC) or Premises Communication Cable (PCC) that is Canadian Standards Association (CSA) approved, designated CMR (formerly FT4 (fire-rated)) per CSA standard C22.2 No. 214-M90. The cable should have a minimum of four pairs twisted 24 AWG solid copper wires. The outside cover of the wire should be clearly stamped "CSA IWC CMR 24 AWG", and have a level 5 (voice and data) transmission rating (CAT-5e) except where the local electrical authority states that CMP (formerly FT6) is required.

Do not use flat wire such as telephone set line cord or lamp wire for prewiring, as it can cause transmission problems, errors and low throughput.

5.2 Identifying Conductors In Cabling And Multimedia Outlets

To identify the conductors in new cat-5e cable, strip off a portion of the outer sheath. This will expose the individual conductors, which are twisted together in pairs. Each working telephone line requires one pair of conductors, and each pair consists of a Tip (T) and a Ring (R) conductor. Each MO required for Internet use requires all eight conductors or wires (ie. four pairs). The manufacturer identifies each conductor by a standard colour code as shown in Table 2.

All conductors must be connected.

TABLE 2 – Identifying Conductors in Outlet Cable (TIA/EIA-568-A wiring configuration)

PAIRS (LINES)		4 AND 8 WIRE COLOR CODE		JACK HARDWARE (PINS)
1	TIP	GREEN	WHITE WITH BLUE BAND	5
	RING	RED	BLUE WITH WHITE BAND	4
2	TIP	BLACK	WHITE WITH ORANGE BAND	3
	RING	YELLOW	ORANGE WITH WHITE BAND	6
3	TIP	WHITE	WHITE WITH GREEN BAND	1
	RING	BLUE	GREEN WITH WHITE BAND	2
4	TIP	BROWN	WHITE WITH BROWN BAND	7
	RING	ORANGE	BROWN WITH WHITE BAND	8

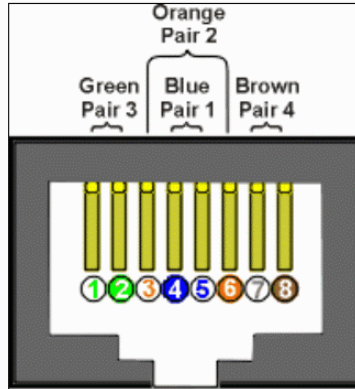


Diagram 5 : Standard 8-pin modular jack (TIA/EIA 568A Standard)

5.3 Outlet Types

A multimedia outlet (MO) provides the means to connect to the following:

- Advanced Multimedia Services;
- Data, Broadband/High-Speed Internet and Data Networking;
- Telephone; and/or
- Optional (Co-ax) for Cable-TV.

Multimedia outlets may combine a multitude of sockets, jacks or connectors of any of the following types: 8-pin modular jack; RCA; S-Video; F-connectors for Cable-TV coax; or fibre optics. This would be called a multifunction outlet; (e.g. Belden/CDT MDVO multimedia module or equivalent).

All 8-pin modular jacks must be wired to match the TIA/EIA-568-A pinout configuration. This industry standard has been adopted by Canada.

If MO's combine 8-pin modular & F-connectors then the 8-pin modular jack portion shall also conform to TIA/EIA-568-A pinout standards.

Exterior outlets must be weatherproof.

5.4 Installation Best Practices

See also Section 3, Planning Multimedia Outlet Locations and Cable Routing.

5.4.1 Multimedia Outlet Tips

- Connect 8-pin modular jacks within each multimedia outlet according to the TIA/EIA-568-A standard as above.
- **You must wire up all conductors** to the multimedia outlet or 8-pin modular jack (commonly known as RJ-45). Cat-5e cable consists of eight wires; **all** should be connected as previously shown.
- The pairs within cat-5e cabling have twists in them. It is important to insure all pairs have the correct twist ratios maintained right up to the jack or outlet terminations. Do

not leave longer pieces straight and untwisted. This will ensure maximum data rates and minimize interference.

- When running outlet cable (four pair, 24 GA CAT-5e minimum) from multimedia outlets to your wiring distribution location (DD), ensure each run is a home run (that means a single direct unbroken cable length). No daisy chaining. This may be referred to as Star Topology or Star Wiring. (see Diagram 2 and 3)
- **Again we recommend a minimum of two cable runs (ie. two separate 4-pair cables) to each MO to provision for future growth or upgrade of MO faceplate.**
- **Keep cable runs direct and unbroken between MO and distribution device (DD).** Although it may be tempting to splice two short lengths together to economize on cable costs, doing so will cause interference, limit flexibility and degrade network performance.
- Place outlets prior to cladding the wall.
- If possible, protect terminations with plastic bags tied on at both MO and DD cable ends, prior to completing drywall and painting.
- Coloured jacks for installation into MO may be a useful option for identifying services eg. black for LAN/internet or white for phone.

5.4.2 Cable Or Wiring Tips

- Do not pull communications and data cables through holes occupied by electrical cables.
- **maximum run length is 90m.**
- Cables that cross should be at 90 degrees to each other.
- Do not exert > 25lbs of pulling force on 4-pairs (CAT-5e and 6).
- **Do not splice wires on runs** – pull another if things go wrong.
- Where required, secure the cable every 600 mm, (24") with a round staple designed for the wire. Do not pinch the wire.
- Use plastic non-metallic staples to support wire and leave the wire loose in the staples. Do not drive staples all the way in as microbends in the copper reduce transmission quality.
- Avoid sharp edges and turns and do not kink the cable, minimum bend radii is 10 x diameter of cable for CAT-5e, 2.5 inch for co-ax RG-6. If a staple pierces the cable, the entire length of cable must be replaced to prevent transmission problems. Where sheet metal framing is used, install grommets to protect the cable from the sharp metal edges.
- When drilling through floor joists, ensure that the structural integrity is not being jeopardized. For example, prefabricated joists may have manufacturers' specification/location for drilling holes. Check with your design engineer/manufacturer or building inspector.
- Leave at least 30 cm, (12") of excess cable at the outlet end.

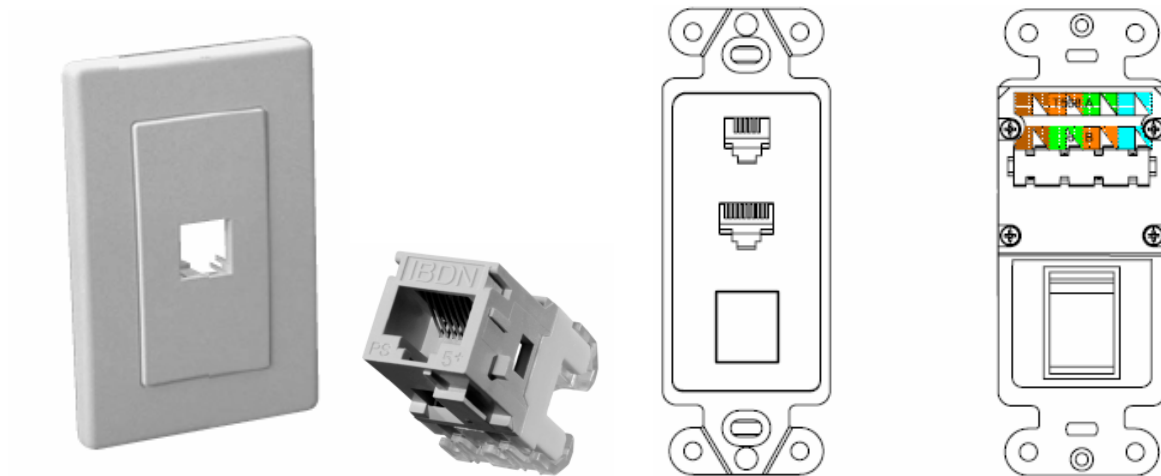
- For new homes consider using conduit to allow for easy pulling of future wiring.
- Exterior cabling must use exterior grade cable.
- Do not kick cabling under baseboards, cabling is loose and can become snagged and damaged. Attaching to baseboards is ok.

5.4.3 DD Tips

- Leave a minimum of 1.5m excess on all cable runs at the DD.
- At a minimum, install two cable runs (communications and data) from your (DD) to the TELUS demarcation point and NIB when required.
- TELUS recommends IDC style strips or blocks and jumpers/patchcords required for cross-connects.
- It is critical to ensure all pairs have the correct twist ratios maintained right up to the IDC strip or block terminations. Do not leave longer pieces straight and untwisted. This will ensure maximum data rates and minimize interference.

5.5 Multimedia Outlets

Examples of Multimedia Outlets follow....



Faceplate with interchangeable jack module

Ortronics MDUTFP11



Faceplate with fixed jack (non-interchangeable)



ATI 040-514D-68F2-WHT

The 8-pin modular jacks (RJ-45) must meet the TIA/EIA 568 A/B pin out standard in order to meet industry certification and cabling standards. Combination 8-pin modular & F-connector jacks (e.g. Belden/CDT MDVO multimedia module or equivalent) shall also conform to TIA/EIA 568 A/B pin out standards.

6. Distribution Device (DD)

6.1 Hardware

Builders and homeowners will require hardware to terminate in-home wiring from outlets; a means to patch or distribute smart home services through to outlets, and provide flexible reconfiguration of such.

A distribution device (DD) is a cross-connect facility used for the termination and connection of outlet cables, distribution device cords, and equipment cords. There is no requirement for secondary protection at the DD.

A DD must be installed inside each home in a location that is accessible for cabling maintenance. The location should be centralized within the home to minimize the length of outlet cables.

Initial DD space requirements should be sized at a minimum of 450 mm (18") width and 450 mm (18") height. The DD should be positioned such that sufficient unobstructed clearance will be available for some potential protrusion of equipment outside the wall surface. If the location of DD necessitates security or physical protection, for example, if located in a closet or a high traffic area, a cabinet is recommended. The cabinet may protrude from the wall. Clearance is necessary to ensure access to the cabinet.

A 15A, 120 VAC nominal, non-switchable duplex electrical outlet must be provided adjacent to the space, board or cabinet or within 0.3 m (1 ft) of the DD. The height of the electrical outlet should be suitable for the DD and associated equipment being installed and shall be in compliance with the Canadian Electrical Code.

6.1.1 Recommended Solution

TELUS recommends the installation of an approved TELUS Structured Media Box as the DD.



14.25"Wx10"Hx4.0"D



14.25"Wx20"Hx4.0"D



14.25"Wx36"Hx4.0"D



The TELUS Panel: Ortronics MDUTSP

This distribution panel mounts inside the Ortronics Connect series enclosures and TELUS enclosures. These panels distribute TELUS TV, Telephone, Data (Ethernet) and have a Security port to interface with alarm panels.

See **Section 11: Appendix C: DD Panel Configuration** (Ortronics)

6.2 Installation Best Practices

1. Required Space – Ortronics Enclosure
2. Distribution Panel – TELUS MDUTSP1
3. Entry point for runs from Multimedia Outlets in rooms and cable run from NIB.
4. Multiple cat 5e runs from rooms and NIB
5. Entry points to DD Distribution Enclosure
6. Reserved area to mount Modem and Router
7. Un-switched 120V Duplex outlet
8. For larger homes with more runs, additional components may be required.

Locate your DD panel or cabinet no closer than 12" (30cm) to a power distribution panel, suggested distance is 24" or 60cm, to protect network equipment from sources of interference.

Clearly mark all set runs, with MO location id and type of service on each (if known) **suggested e.g. MBR01, KTCH01, DNGR01, LIVR01a LIVR01b**. Clearly identify and mark all services and ports.

Use a tone generator or Fluke MicroscannerPro kit to assist in determining which cable runs connects to which room. See instructions supplied with your tool.

6.3 Connecting ADSL Service

For single room outlet requiring ADSL service:

1. patch RJ-11 jumper from RJ-11 jack marked ADSL to the RJ-11 jack on modem
2. patch RJ-45 jumper from ADSL modem to appropriate room outlet jack

For multiple outlets requiring service:

1. install a switch or residential gateway
2. patch RJ-11 jumper from RJ-11 jack marked ADSL to the RJ-11 jack on modem
3. patch RJ-45 jumper from ADSL Modem Ethernet port into one switch/gateway/router port (possibly marked WAN or UPLINK port); patch all

outlets to be "ADSL Enabled" into remaining ports on switch/gateway/router you may own.

7. Connecting Telephone Service

7.1 Safety Precautions

Remember, when working on existing telephone service it is possible to come in contact with electrical currents. Again, TELUS recommends that installations be carried out by a trained technician. Work on telephone or any wiring should never be undertaken during thunder and lightning storms.

To reduce possible feedback of potentially hazardous voltages either caused by lightning strikes or contact with high voltage power lines, the Canadian Electrical Code requires the installation of a primary protector as per Rule 60-200 as noted below:

60-200 Provision of Primary Protectors:

- (1) A primary protector shall be provided on each electrical communication circuit, except as provided in Subrule (4).
- (2) The primary protector shall be located in, on, or immediately adjacent to the structure or building served and as close as practicable to the point at which the conductors enter or attach.
- (3) The primary protector shall not be located in any hazardous location as defined in Sections 18, 20 and 24, nor in the vicinity of flammable or explosive materials.
- (4) A primary protector need not be provided if no portion of the circuit is considered exposed plant.

Primary protection must be provided on circuits considered exposed plant. Where located outdoors, the circuit shall be located below grade level and installed in a conduit. These circuits shall not have any exposure to lightning or contact with power lines at all times. Direct buried cable/conductors are generally classed as exposed plant because they are usually susceptible to lightning strikes.

7.2 Service Connection

In new homes, the telephone entrance cable (aerial or underground) terminates in the NIB box located on the outside walls of your single-family residential buildings. It is usually located close to the electrical meter. To gain access to the NIB box or NIB lid and to the demarcation jacks, loosen the screws and optional customer lock located on the right hand side of the NIB box or lid. With the outer door swung open, access to the demarcation jacks and/or inside wire is now possible.

In accordance with regulations, TELUS must be contacted to determine the proper demarcation point.

7.3 Demarcation Point

The terminals found on demarc blocks and protectors could be marked in a number of ways:

Conductor	Colour	Identification	TELUS side	Customer side
TIP	Green	T1	T _{in}	T _{out}
RING	Red	R1	R _{in}	R _{out}

WARNING!

Altering or adding to the telephone protector could be hazardous to your property or person and should never be undertaken except by a trained telephone technician.

8. Testing The Wiring And Multimedia Outlets

Verification testing should be performed on all outlet and cable installations. Test for the following faults:

- opens
- shorts
- miswires
- discontinuities, pin-to-pin or other
- grounds

Example Test steps:

No.	Step	Expected Result	Pass/Fail
1	Insert test cable from test instrument into Modular 8-pin Jack (RJ-45) socket of Multimedia Outlet		
2	Run Wiremap test to ensure correct cable/socket wiring.	Pass	
3	Run Length test: Length required less than 90m (295 ft)	Less than 90m	
4	Check for cable faults (indicated by distance Open or Short is away from outlet under test)	No faults or zero distance	
5	Check far-end connector (at DD) is not faulty	No faults	

Note: This verification check for residential wiring does not test the information carrying capacity of the link. Network cables installed in typical residences are shorter than those found in commercial installations and do not suffer as much from losses. Good capacity can be expected when the guidelines for cable routing and installations have been adhered to.

Suggested testing devices include:

- FLUKE MicroScannerPro (or better)
- FLUKE DSP4300
- Agilent Wirescope 350
- ResiTester

or similar.

9. Appendix A: Sample Test Summary Report

Home Network Certification – Verification Check Sheet and Install Record

Installation date: ____/____/____ Crew: _____
 Service contact Ph.: (____) _____

Installation #: Development Name: Address: Lot/Block: City: Province : Postal Code:	Installer Company Name: Address: City: Prov: Post Code: Phone: Email:
---	---

Example is shown on first line with number of drops per cable type.

Note C3 = category 3 C5= category 5 C5e= category 5e C6 = category 6

Test – V = Verified for continuity, wiremap, and length, C = Certified to cabling performance specified per the ANSI/TIA/EIA-570-A Standard

Outlet / Drop	Voice					Data					Coax			Other / Note	
Location	C3	C5	C5e	C6	Test	C3	C5	C5e	C6	Test	RG-6	RG-11	Test		
Example: MBR01			1		V			1		C				primary TELUS outlet	

10. Appendix B: Wiring Terminations

10.1 Wiring Terminations In NIB

Ensure no more than 2 twists are undone when terminating CAT 5e cable

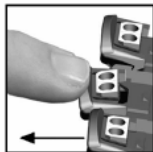
1. Drop Wire and Inside Wiring to be terminated according to the following instructions:
 - T stands for Tip and will always be the Predominately White wire with a colored stripe
 - R stands for Ring and will always be the Predominately “Colored” wire corresponding to the Tip colored stripe
 - See attachment: **IDC Termination Instructions**
 - Terminate the Copper Drop wire on the protection unit on the door in the following manner:
 - Untwist a SINGLE twist of the CAT5e Drop Wire pair (White / Blue) and terminate on the IDC connector marked T (in) and R (in)
 - Terminate the CAT5e Inside wire on the Pots Splitter unit on the door in the following manner:
 - Strip the ends of the CAT5e Inside Wire pair (White / Blue) ½” from the end
 - Untwist a SINGLE twist of the CAT5e Inside Wire pair (White / Blue) and terminate on the screw terminals of the Pots Splitter marked Phone
 - Strip the ends of the CAT5e Inside Wire pair (White / Green) ½” from the end
 - Untwist a SINGLE twist of the CAT5e Inside Wire pair (White / Green) and terminate on the screw terminals of the Pots Splitter marked ATU-R

10.2 IDC Termination Instructions

MiniRocker™ Connector Termination Procedure

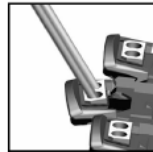
1. Wire Termination

Figure 1



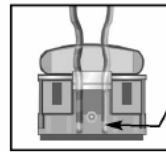
Open contact actuator by simply pulling back on “Baseball caps” with thumb or finger. Do not over open. (Figure 1)

Figure 2



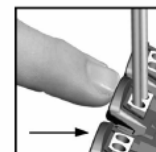
Insert wire pair into color coded ports. (Figure 2)

Figure 2A



Visually inspect for full wire insertion through the transparent body. (Figure 2A)

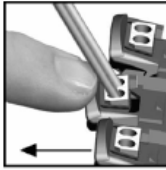
Figure 3



Close firmly. Hear, feel, snap and lock (Figure 3). Repeat for each connection. Note: Make sure that all contact actuators are left in the “down” or locked position.

2. Re-termination

Figure 4



Open contact actuator to fully open position by simply pulling back on "baseball caps" with thumb or finger. Do not over open. (Figure 4)
Remove wire by pulling it out fully.

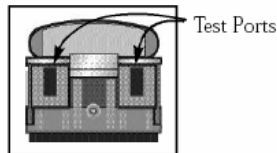
Figure 5



If existing wire is to be re-used, cut off at least $\frac{1}{4}$ " (6mm) before re-termination (Figure 5). Repeat termination procedure above.

3. Testing Routine Using The Test Clip

Figure 6



To Test: Insert test clip into test ports on face of MiniRocker connector (refer to Figure 6). Fully insert test clip to full stop as shown. (Figure 6A)

Figure 6A

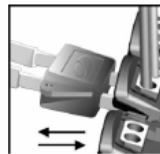
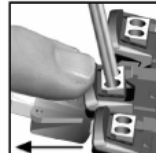
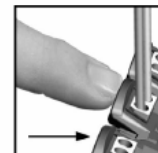


Figure 7



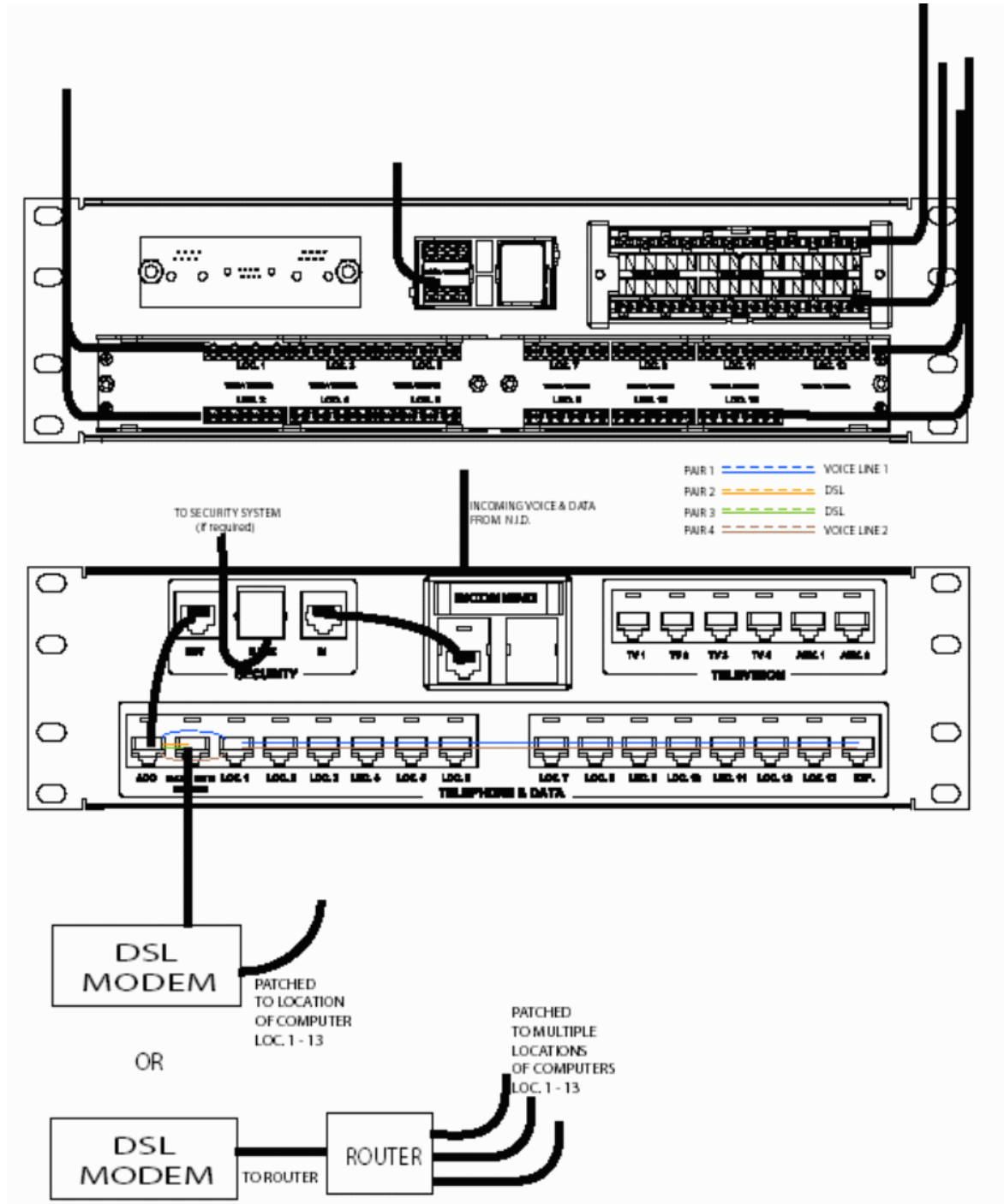
To test the CO/Input Side only, open contact actuator with test clip inserted (Figure 7).

Figure 8



Remove the test clip. Close contact actuator firmly. Hear, feel, snap and lock (Figure 8).

11. Appendix C: DD Panel Configuration (Ortronics)



11.1 ORTRONICS MDUTSP - IDC / Pin Identification

- INCOMING JACK
 - IDC on the back to a RJ45 on the front
 - 4 pair feed from NIB is terminated on the IDC
 - Pr 1 – Dialtone
 - Pr 2 – Vacant
 - Pr 3 – DSL Signal
 - Pr 4 – Reserved for 2nd line
 - All Pairs are connected through to the RJ45 Incoming Jack
 - Pair 1 connects to Pins 4 & 5
 - Pair 2 connects to Pins 3 & 6
 - Pair 3 connects to Pins 1 & 2
 - Pair 4 connects to Pins 7 & 8
 - RJ45 patch cord (included) then patch dial tone to “security in”.
 - Blank is included for future use if required. An addition RJ45 may be inserted.
- SECURITY JACK
 - IN JACK
 - All 4 pairs plugged into “security in”, Pair 1 is bridged to “in” of RJ31X for POTS service only when a RJ45 plug is inserted into “RJ31X” port
 - Pairs 1 2, 3 & 4 from the RJ45 are distributed to “security out”
 - RJ31X JACK
 - When the cord to the Alarm Panel is plugged in, dialtone is routed thru the alarm panel and back out to the out of the RJ31X
 - Out pair of RJ31X bridged to pair 1 of OUT
 - OUT JACK
 - Patch Cord from OUT to ADO to feed dialtone and DSL to jacks
- ADO JACK
 - Pairs 1 & 4 are bridged to pairs 1 & 4 of LOC 1 thru LOC 13 and EXP
 - When the patch cord from SECURITY OUT is connected, dialtone is supplied to LOC 1 thru LOC 13 and EXP jacks
 - When the patch cord from SECURITY OUT is connected, DSL is supplied to “DATA INTO MODEM”
 - Pairs 2 & 3 are bridged to “DATA INTO MODEM”
- DATA INTO MODEM JACK
 - RJ11 cord feeds DSL signal to modem (PAIRS 2 & 3, PINS 1,2 & 3,6)
- LOC 1 thru LOC13 & EXP JACKS
 - Pairs 1 & 4 are bridged between jacks
 - Straight 4-pair IDC on the back to a RJ45 on the front
 - Inside wire set runs providing POTS and DSL services are terminated on LOC1 thru LOC13 as required
 - DSL service is provided to the individual room outlets when a patch cord is connected from the modem or router as required
 - Pairs 2 & 3 are passed to IDC on rear at each location(non-bridged)
- TV JACKS
 - Straight 4-pair IDC on the back to a RJ45 on the front (CAT 5e)
 - Designated TELUS TV inside wire set runs are terminated as required
 - Service is provided when a patch cord is connected from a switch
- AUX JACKS
 - Straight 4-pair IDC on the back to a RJ45 on the front (CAT 5e)
 - For future expansion

11.2 DD Panel Termination (Ortronics)

All terminations on the Ortronics Panel are to be completed with the appropriate 110 Tools.

NOTES:

1. Terminate the 4 pair CAT 5e feed to the panel on the back of the Incoming Jack.
2. Terminate all Tel/Data runs on Locations 1-13
3. Terminate all TELUS TV runs on TV1-4 locations and AUX 1 & 2 in required
4. Complete the Label on the inside of the panel cover
5. For single set runs to each location, the Ortronics MDUTFP11 or ATI 040-514D-68F2-WHT jacks may be used

If 2 set runs are placed to each location, 1 will be dedicated for Tel/Data and the other will be dedicated for TELUS TV and terminated on the panel as indicated. This scenario requires the Ortronics jack MDUTFP11 for the Tel/Data and an RJ45 EDVO outlet added in the bottom knockout position

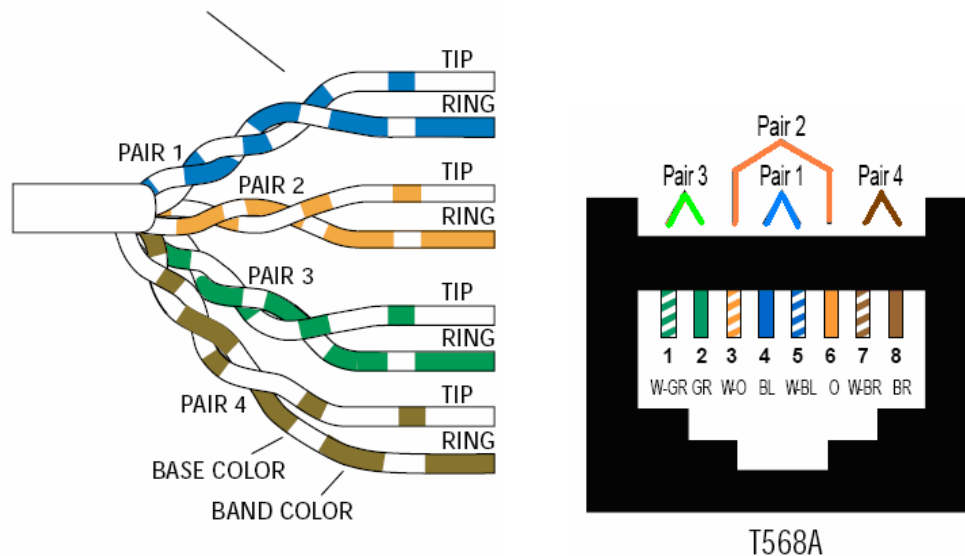
When single Cat-5e set runs are used with the TELUS MDUTSP1 Panel (Distribution Device), a dual jack consisting of single RJ-11 and RJ-45 (8-Pin Modular) such as an Ortronics MDUTFP11-88 or an ATI 040-514D-68F2-WHT can be used.

12. Appendix D: 8-PIN Modular Jack Terminating Instructions

The (RJ-45) jacks are to be terminated according to TIA-568-A standards as shown below.

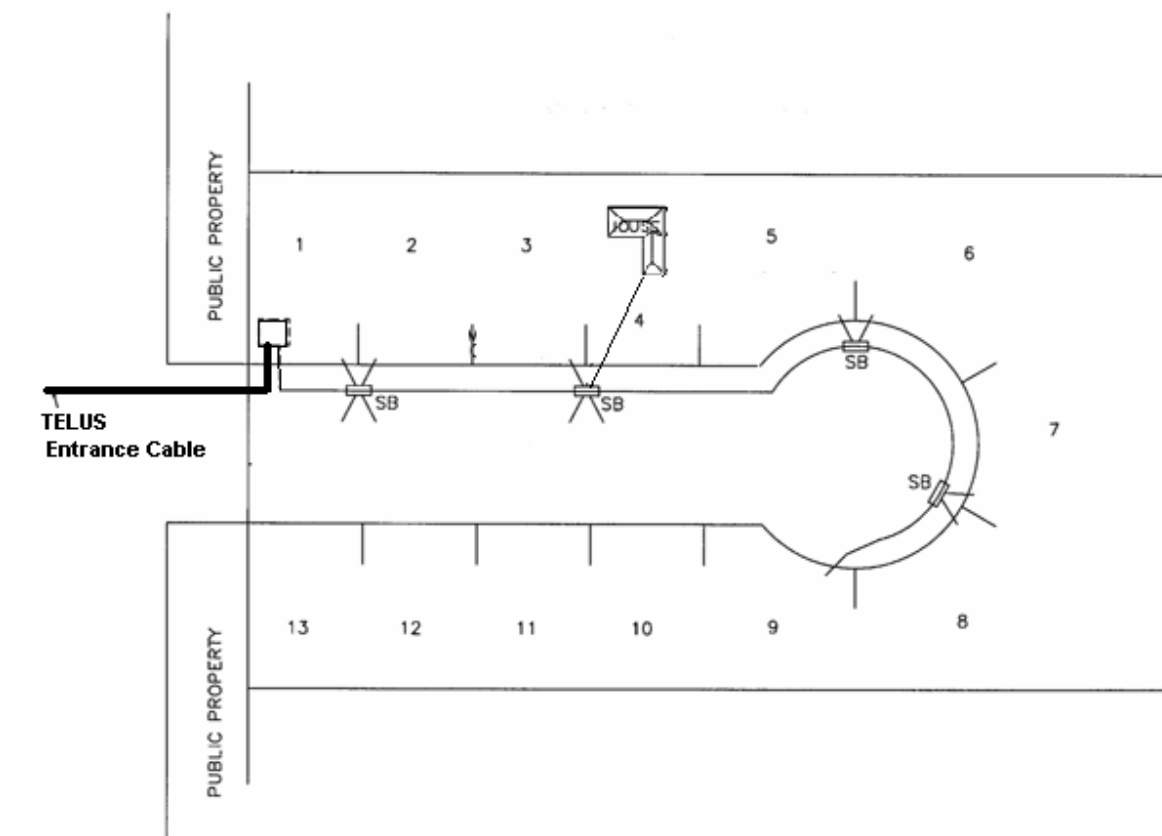
Standard 4-Pair Wiring Color Codes		
Pair 1	T	White/Blue
	R	Blue/White
Pair 2	T	White/Orange
	R	Orange/White
Pair 3	T	White/Green
	R	Green/White
Pair 4	T	White/Brown
	R	Brown/White

A. Band-Striped Twisted Pair Wire



13. Appendix E: Strata Developments

The following is an example of a Strata style development where the TELUS Entrance Cable is terminated and protected in a structure near the entrance to the development. The MDU Pots Splitter is also located in this location.



NOTES:

1. A Transition Housing must be placed at each house for transitioning the drop cable to the 4 pair CAT 5e inside wire from the TELUS Hub.
2. When individual 4 pair drops are placed to each housing unit, all 4 pairs of the drop and the 4 pair CAT 5e inside wire from the TELUS Hub must be terminated on an approved CAT 5e connector. (i.e. a grease filled BIX strip complete with BIX Wire Retainer clips).



14. Appendix F: Industry standards

Standards pertaining to the creation of this TELUS wiring guide:

National Building Code of Canada

Canadian Electrical Code and British Columbia / Alberta Electrical Code

CAN/CSA No.T525-94 – Residential Wiring for Telecommunications

CAN/CSA C22.2 No.182.4 – M plugs, Receptacles Connectors for Communication Systems

CAN/CSA T530 – M90 Building Facilities Design Guidelines for Telecommunications

CAN/CSA T528 – Design Guidelines for Telecommunications

CN/CSA T528 – Design Guidelines for Administration of Telecommunications Infrastructure in Commercial Buildings

CS-03 – Terminal Attachment Program

TIA/EIA-568-A – 8-pin modular jack wiring configurations

TIA-570-A and TIA-570-B "Residential Telecommunications – Infrastructure Standard"

Acknowledgements

Diagrams 2 and 3 in this guide, are extracted, courtesy of BICSI®, from BICSI® Telecommunications Distribution Methods Manual (TDMM), 10th edition, Chapter 17 (Residential Cabling).

Additional Information

For British Columbia : use Form P546 - Residential Service Entrance Requirements,

For Alberta : use Form P630 - Residential Service Entrance Requirements,

Forms are available from the Building Industry Consulting Service Web site at:

<http://www.telus.com/bics>

or call TELUS Prewire at :

1-800-665-5259 in British Columbia

1-888-530-6900 in Alberta